

What is claimed is:

1. A catalyst assembly comprising a substrate, nanofilaments which have a nanometer-size diameter and are formed on the substrate, and particles which have a nanometer-size diameter, at least one of the nanofilaments and the particles having a catalytic function.
2. A catalyst assembly according to claim 1, wherein the nanofilaments are formed at intervals of from 2 to 200 nanometers.
3. A catalyst assembly according to claim 1, wherein the nanofilaments are formed at intervals of from 2 to 100 nanometers.
4. A catalyst assembly according to claim 1, wherein the particles have a diameter of from 0.5 to 50 nanometers.
5. A catalyst assembly according to claim 1, wherein the nanofilaments grow up from a surface of the substrate.
6. A catalyst assembly according to claim 1, wherein the nanofilaments protrude from a surface of the substrate.
7. A catalyst assembly according to claim 1, wherein the particles are supported on the nanofilament.
8. A catalyst assembly according to claim 1, wherein the substrate is in the shape of plate, honeycomb, particle, or stick.
9. A catalyst assembly according to claim 1, wherein the substrate comprises at least one selected from the group consisting of an oxide, a nitride, or a carbide of a metal or silicon, and a solid solution thereof.
10. A catalyst assembly according to claim 1, wherein the particles have a catalytic function.
11. A catalyst assembly according to claim 1, wherein the particles comprise at least one selected from the group consisting of a metal, a metal oxide and a

metal sulfide.

12. A catalyst assembly according to claim 1, wherein the particles comprise platinum.

5 13. A catalyst assembly according to claim 10, wherein the nanofilaments comprise a material having a co-catalytic function.

14. A catalyst assembly according to claim 10, wherein the material has a function for adsorbing and desorbing oxygen.

10 15. A catalyst assembly according to claim 10, wherein the nanofilaments comprise an oxide of cerium, zirconium or yttrium, or a solid solution thereof.

16. A catalyst assembly according to claim 10, wherein the nanofilaments comprise  $\text{CeO}_2$ ,  $\text{ZrO}_2$  or  $\text{Y}_2\text{O}_3$ .

15 17. A catalyst assembly according to claim 10, wherein the nanofilaments comprise  $\text{CeO}_2$ .

18. A catalyst assembly according to claim 1, wherein the particles comprise platinum and the nanofilaments comprise  $\text{CeO}_2$  or a solid solution of  $\text{CeO}_2$  and  $\text{ZrO}_2$ .  
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19. A catalyst assembly according to any one of claims 1 to 18, wherein the catalytic function comprises purifying an automobile exhaust gas.

20. A method of purifying an automobile exhaust gas comprising using a catalyst assembly according to any one  
25 of claims 1 to 18.

21. An automobile exhaust gas purifying device comprising a catalyst assembly according to any one of claims 1 to 18.